Recursive Coherence:

Foundations for an Adaptive Philosophy of Science, Mind, and Society

Benjamin James

August 9, 2025

Abstract
This paper presents a unified philosophical framework in which metaphysics, epistemology, and critical theory are integrated under a single coherence-first law of persistence. Four interdependent constructs form the system's architecture. Dynamic materialism, defining matter as adaptive process rather than inert substance. Adaptive realism, identifying the real as that which persists across recursive coherence arbitration. Synthetic epistemology, structuring knowledge as a self-correcting process of coherence tracking. And, symbolic lock-in, the failure mode in which symbolic systems stabilize into high-entropy attractors disconnected from the adaptive substrate. This framework operates recursively. The material substrate sets the scope of reality, reality constrains epistemic mapping, epistemology governs symbolic evolution, and symbolic lock-in is prevented by epistemic design. This closed, self-auditing structure addresses the fragmentation of traditional philosophy, offering a formally grounded account of persistence that is both ontologically flexible and resistant to conceptual stagnation. Applications extend across science, governance, artificial intelligence, and cultural critique, where adaptive viability depends on maintaining structural coherence across physical, cognitive, and symbolic layers. The result is a general philosophy capable of integrating descriptive, normative, and diagnostic functions without redundancy, anchored in a universal principle of coherence-driven persistence.

Keywords: dynamic materialism, adaptive realism, synthetic epistemology, symbolic lock-in, coherence, ontology, epistemology, philosophy of science, adaptive systems, recursion

Philosophical Fragmentation

Philosophy's core domains, metaphysics, epistemology, and critical theory, have historically evolved in relative isolation. Metaphysics addresses the question of what exists, epistemology investigates how we come to know it, and critical theory examines where systems fail and how they might be transformed. In practice, these have developed as discrete traditions, each with its own methodologies, terminologies, and criteria of validity. This separation has generated persistent asymmetries. Metaphysical claims that lack epistemic grounding, epistemologies that presume ontologies they cannot justify, and critiques that lack a coherent account of the reality they seek to reform.

The result is structural fragmentation. Without integration, symbolic systems, whether scientific paradigms, legal frameworks, or cultural narratives, ossify into self-reinforcing architectures. These closed loops resist adaptive revision, producing philosophical blind spots and reinforcing cultural stagnation. What is needed is a unified structure in which metaphysics, epistemology, and critique operate as interdependent functions of a single recursive logic.

Recursive coherence is a framework in which reality, knowledge, and symbolic systems are governed by a single law of persistence: *structures endure only if they increase internal coherence faster than they dissipate into entropy, while preserving their adaptive possibility space*. In Dynamic Materialism, matter is not inert substance but adaptive process, reorganizing under coherence gradients. In Adaptive Realism, "real" is defined as that which persists across recursive coherence arbitration, aligning stability with adaptability. In Synthetic Epistemology, knowing is an evolving architecture for tracking and refining

coherence across scales, rejecting static axioms in favor of self-correcting integration. Symbolic Lock-In names the failure mode in which symbolic structures self-stabilize into high-entropy attractors, severing their alignment with the adaptive substrate. Together, these layers form a closed, self-auditing philosophical system. Physical in grounding, ontologically flexible, epistemically synthetic, and immune, by design, to symbolic stagnation.

Dynamic Materialism, Matter as Adaptive Process

Dynamic Materialism rejects the conception of matter as inert, static substance. Matter is defined here as coherence-constrained adaptive flux: *a continuous process of self-maintenance within thermodynamic and informational constraints*. This definition reframes the ontological status of matter from an unchanging substrate to an active participant in its own persistence.

From thermodynamics, persistence is not a given. Any structure embedded in an open system is subject to entropy increase; without compensatory processes, it will decay. The second law dictates that disorder grows unless work is performed to maintain order. In Dynamic Materialism, this work is not an external imposition but an intrinsic feature of matter's organization. At all scales, atomic, molecular, biological, planetary, and cosmological, persistence entails ongoing exchanges of energy and information that stabilize coherence against entropic loss.

Recursive coherence extends this thermodynamic insight. Coherence refers to the structured alignment of a system's internal states such that they reinforce each other over

time. Matter persists only if its internal coherence increases or is maintained faster than entropy degrades it. This yields the persistence equation:

$$\frac{dC}{dt} = \Gamma \cdot C^n - \lambda \cdot C + \eta(\nabla S \cdot \nabla \Omega)$$

Here, C is coherence density, Γ is feedback gain amplifying self-reinforcing stability, n controls nonlinearity, λ is entropy leakage, ∇S the entropy gradient, and $\nabla \Omega$ the adaptive possibility gradient. Persistence becomes a measurable condition, not a metaphysical assumption. If coherence gain falls below entropy loss, the system disintegrates.

Matter, in this view, is not simply "there"; it is always doing, adapting, exchanging, reorganizing. An electron's stability emerges from ongoing field interactions that constrain its degrees of freedom. A crystal lattice maintains its form through the minimization of free energy within its boundary conditions. A living cell persists through metabolic processes that actively counteract entropy by importing negentropy from its environment. In each case, the ontological reality of the object is inseparable from the continuous adaptive processes that sustain it.

This diverges sharply from classical materialism. In classical models, matter is fundamentally passive, with change explained only by external forces. Such a view treats persistence as ontologically primary and activity as contingent. Dynamic Materialism inverts this. Activity is primary, and persistence is the emergent result of continuous adaptation. Where classical materialism emphasizes substance, Dynamic Materialism emphasizes process.

It also diverges from idealism, which locates persistence in the stability of mental or perceptual constructs. Idealism can account for the variability of experience but cannot

explain the structural necessity of energy and coherence exchange for persistence. While idealism views the material world as secondary or derivative, Dynamic Materialism insists that adaptive persistence is a physical necessity independent of any observer, governed by coherence constraints rather than perceptual stability alone.

Dynamic Materialism integrates thermodynamic and coherence principles into a single persistence law. From thermodynamics, it inherits the inevitability of entropy and the necessity of compensatory processes. From recursive coherence theory, it inherits the recognition that stability requires not just energy flow but structured, self-reinforcing organization. Together, these principles describe matter as a metastable configuration in continuous negotiation with its environment, adjusting to preserve structure in the face of constant perturbation.

This has several implications for the entirety of this philosophical framework:

1. Epistemological Grounding: In Synthetic Epistemology, knowing is not the passive reception of data but the active stabilization of cognitive coherence. Dynamic Materialism provides the ontological parallel; just as knowledge persists through recursive refinement, matter persists through recursive stabilization.
2. Metaphysical Continuity: Adaptive Realism asserts that reality is not static but co-evolves with our models of it. Dynamic Materialism grounds this claim in physics; matter itself is a co-evolving process, not a fixed inventory, ensuring that realism must account for adaptation at the ontological level.
3. Critical Theory of Symbolic Lock-In: Symbolic systems can ossify when their internal coherence becomes decoupled from adaptive reality. Dynamic Materialism warns

against any worldview that assumes stability without continuous adaptation. In both matter and meaning, static persistence is an illusion; without active coherence maintenance, decay is inevitable.

4. Cosmological Scope: In cosmology, galaxies, stars, and planets emerge and persist only as long as feedback processes sustain coherence against dispersive forces. Dynamic Materialism frames these large-scale structures as no different in principle from atoms or living organisms in their dependence on adaptive processes.
5. Unified Ontology: Because matter's persistence mechanism is identical in form to persistence in cognitive, social, and symbolic domains (maintenance of coherence against entropy) it provides a common substrate for cross-domain philosophical integration.

By situating matter within an active persistence framework, Dynamic Materialism resolves a core philosophical tension. In classical materialism, the question "Why does matter persist?" has no deeper answer than "Because it exists." In Dynamic Materialism, persistence is a measurable, falsifiable property. If a system's adaptive coherence falls below a threshold, it ceases to be. This allows ontology to be linked directly to physics and information theory, eliminating the gap between metaphysical claims and empirical observation.

Furthermore, this framework implies that change and persistence are not opposites but mutually dependent. A perfectly static system cannot adapt and will be eroded by entropy; a system in constant chaotic flux cannot maintain coherence and will dissolve. Persistence arises from the balance of variation and stability. Enough change to respond to

environmental fluctuations, enough stability to preserve identity. This dynamic balance is the defining feature of matter in this ontology.

In practical terms, this reconceptualization demands that any model of the material world account for recursive coherence at its foundation. Physical laws are not static descriptors of inert matter but expressions of constraints that channel adaptive processes. Quantum states evolve not because time passes in an abstract sense but because coherence conditions drive them toward or away from stability thresholds. Biological evolution is a cascade of material persistence strategies, each refining the balance of variation and stability in response to entropy.

Dynamic Materialism establishes a coherent, thermodynamically and informationally grounded ontology in which matter is not a static given but an active, self-sustaining process. It replaces the metaphysical inertia of classical materialism with a measurable, adaptive principle and avoids the perceptual primacy of idealism by rooting persistence in physical coherence constraints. This definition provides the necessary substrate for the higher layers of this integrated framework, Adaptive Realism, Synthetic Epistemology, and the critique of Symbolic Lock-In, ensuring that each is anchored in a physical reality understood as ongoing adaptive negotiation rather than static being.

Adaptive Realism, Ontology as Coherence Persistence

Adaptive Realism defines the real as that which persists across recursive coherence arbitration. In this framework, “real” is not synonymous with mere existence at a moment in time, nor is it defined solely by human perception or conceptual construction. Rather, reality

is constituted by structures, material, informational, or systemic, that maintain their coherence through successive cycles of interaction, perturbation, and adaptation. A system is real in this sense if it can withstand repeated evaluation by the criteria of persistence established in Dynamic Materialism: *the ability to maintain or increase coherence faster than it is eroded by entropy, without collapsing its adaptive possibility space*.

This ontology follows directly from the process-based account of matter developed in Dynamic Materialism. If matter itself is coherence-constrained adaptive flux, then the criterion for being is inherently tied to the success of this adaptive process. Persistence is not an incidental property of real entities; it is the primary indicator of their ontological status. The real is that which can endure, not through static invariance, but by negotiating the balance between stability and change required to sustain coherence in a dynamic environment.

Recursive coherence arbitration is the mechanism by which this endurance is tested. At every scale, systems are subject to ongoing evaluation, whether in the form of physical interactions, ecological pressures, social negotiations, or cognitive revisions. Each cycle of interaction is an opportunity for the system's structure to be confirmed, refined, or degraded. Systems that fail to maintain their coherence through these repeated tests dissolve into noise or are subsumed by other, more stable patterns. In this sense, reality is not a fixed inventory but a dynamic population of persistence-qualified processes.

Adaptive Realism differs fundamentally from naïve realism, which holds that reality consists of objects existing independently of our observation and that these objects possess fixed properties. While Adaptive Realism affirms the independence of reality from human

perception, it denies that such independence is characterized by fixity. Instead, it emphasizes that properties themselves are the outcomes of adaptive stabilization processes. The apparent stability of a property is always provisional, maintained only so long as the underlying coherence mechanisms remain effective. A mountain, a species, or a political institution is not real because it is immutable, but because it has sustained coherence across vast ranges of perturbations and over multiple scales of arbitration.

It also diverges from anti-realism, which construes reality as dependent on conceptual schemes or linguistic frameworks. Adaptive Realism rejects the idea that reality is purely a projection of human cognitive or cultural structures. While it acknowledges that our access to reality is mediated through models, languages, and symbolic systems, it maintains that these mediations succeed only to the extent that they align with coherence structures that exist independently of our representations. A model that fails to track such structures will eventually lose predictive and operational validity, just as a physical system that fails to maintain coherence will disintegrate.

The ontological stance of Adaptive Realism is thus both independent and filtered. Reality is independent in that its coherence constraints operate whether or not they are perceived or conceptualized. It is filtered in that what counts as “real” at any given moment is the subset of all possible structures that have survived the recursive arbitration of coherence. This dual aspect allows Adaptive Realism to accommodate both the objectivity of persistence criteria and the selectivity of survival in dynamic environments.

From the perspective of Dynamic Materialism, this ontology is inevitable. If all matter and structure are engaged in active coherence maintenance, then reality is simply the set of

entities and processes that have successfully done so over time. This applies at every scale. Subatomic particles persist through field interactions that stabilize their properties; biological organisms persist through metabolic and reproductive strategies; social institutions persist through cultural reinforcement and adaptation to shifting conditions. The common denominator is the capacity to meet persistence thresholds in the face of entropy and disruption.

This framing also clarifies why reality is not reducible to a snapshot of current existence. Many configurations that exist in a given moment will not survive further cycles of coherence arbitration; they are transient fluctuations without long-term persistence. Conversely, some entities or processes may be real in the ontological sense even if they are not directly observable, so long as their coherence maintenance can be inferred from their effects. For example, a stable ecological interaction between species may remain unobserved, yet it is real insofar as it persists through adaptive feedback loops that sustain the ecosystem's integrity.

Adaptive Realism also reframes the epistemic challenge. If the real is defined by persistence across recursive arbitration, then the task of inquiry is to identify which structures possess this resilience and to understand the mechanisms by which they maintain it. This shifts the focus from cataloging static properties to mapping adaptive capacities and recursive coherence strategies. It demands that our models account for not just what exists now, but what can endure under the full range of environmental and systemic pressures.

This ontology has several direct implications for the broader philosophical framework:

1. Integration with Synthetic Epistemology: Since knowledge is a coherence-tracking process, our epistemic systems must themselves survive recursive arbitration. Adaptive Realism provides the target. Accurate models are those that successfully map persistence-qualified structures and anticipate their adaptive trajectories.
2. Connection to Symbolic Lock-In: Symbolic systems that fail to adapt lose contact with the reality defined by persistence criteria. Over time, such systems generate models that are internally coherent but ontologically empty, collapsing under the weight of their own disconnection. Adaptive Realism establishes the standard by which such failures can be diagnosed. A symbol system is in lock-in when its coherence no longer correlates with the persistence of its referents.
3. Ontological Pluralism with Constraint: Adaptive Realism accommodates multiple coexisting realities at different scales, provided each meets its own persistence thresholds. A chemical compound, a language, and an economic market are all real within their respective domains, yet each is bound by the same underlying requirement of recursive coherence maintenance against entropy.
4. Elimination of Static Absolutes: Because persistence is contingent on adaptive capacity, there are no absolute, immutable realities. Even the most stable-seeming structures are subject to eventual change if their coherence mechanisms fail. This view replaces metaphysical permanence with ontological durability as the highest achievable condition.

In this way, Adaptive Realism offers an ontology that is fully compatible with the process view of matter in Dynamic Materialism while extending it into a general account of what it means

for something to be real. Reality is not an inert backdrop but the evolving set of structures that have successfully met the demands of coherence persistence through recursive arbitration. It is both independent of our perception and shaped by the selective pressures that determine survival in a universe governed by entropy and adaptation.

By grounding ontology in persistence rather than substance or perception, Adaptive Realism provides the necessary bridge between the physical substrate of Dynamic Materialism and the epistemic architecture of Synthetic Epistemology. It ensures that the "real" is defined in terms that are measurable, testable, and universally applicable, allowing for consistent philosophical integration across the physical, cognitive, and symbolic domains. This grounding makes it possible to diagnose and prevent symbolic lock-in, as any symbolic structure that ceases to correspond to persistence-qualified reality can be recognized as having fallen out of alignment with the ontology that defines reality itself.

Synthetic Epistemology, Knowledge as Recursive Coherence Tracking

Synthetic Epistemology defines knowledge as the sustained and adaptive tracking of coherence across recursive scales. In this framework, truth is not static correspondence between proposition and fact, nor is it reducible to mere internal logical consistency. Truth is defined as maximal alignment between the internal coherence of a model and the recursive coherence of its object, where the object may be a physical system, a process, or a symbolic structure that itself evolves under the constraints of persistence. A model is true to the extent that its structure not only mirrors but also predicts and adapts to the coherence-preserving dynamics of what it represents.

This definition follows from the ontological premises established in Dynamic Materialism and Adaptive Realism. If matter is coherence-constrained adaptive flux, and the real is that which persists across recursive coherence arbitration, then knowledge must be the capacity to model and update our representations in a way that remains in step with these persistence mechanisms. The aim of inquiry is not the discovery of eternal, unchanging truths, but the maintenance of model-world alignment under conditions where both the model and the world are in constant adaptive motion.

At the foundation of Synthetic Epistemology lies the principle of coherence weighting. Not all information about an object contributes equally to the accuracy of its model. Features that are central to the object's persistence, those that play a causal role in maintaining its coherence, must be weighted more heavily in the model than incidental or transient features. This weighting is recursive. Once identified, coherence-relevant features must themselves be evaluated for stability under changing conditions, ensuring that the model focuses on structural invariants rather than superficial regularities.

Formally, let C_m represent the model's internal coherence and C_o represent the object's coherence. The truth condition can be expressed as:

$$T = \max\ \mu\left(\frac{\partial C_m}{\partial C_o}\right)$$

where μ is a weighting function that assigns greater value to variables most directly involved in sustaining C_o. A model achieves higher truth alignment when changes in the object's coherence are reliably reflected in the model's own coherence structure.

The second invariant is the pruning of incoherent signals. Because any cognitive or observational system operates in an environment rich with noise, the epistemic process

must include mechanisms for discarding signals that do not contribute to, or that actively degrade, the model's coherence alignment with reality. This is not a simple matter of ignoring anomalies; some anomalies may be coherence-relevant perturbations requiring model revision. The pruning rule is that information should be discarded only if its integration into the model reduces the model's predictive capacity with respect to the object's persistence mechanisms.

Formally, let S be a new signal. Its inclusion in the model is warranted if:

$$\Delta T_S > 0$$

where ΔT_S is the change in truth alignment resulting from integrating S. If $\Delta T_S < 0$ and no compensatory gain in option space occurs, the signal is incoherent relative to the model's purpose and should be pruned. This ensures that the model remains lean and adaptively relevant rather than bloated with low-value complexity.

The third invariant is the preservation of option space. An epistemic system that achieves short-term accuracy at the expense of its ability to adapt to future changes risks epistemic lock-in, a direct parallel to symbolic lock-in at the cultural level. Preserving option space means structuring models so that they can be revised in light of new evidence without collapsing their foundational architecture. This requires that the model's core representations be modular and decomposable, allowing for targeted updates rather than wholesale replacement when partial incoherence is detected.

In formal terms, option space preservation can be represented as maintaining:

$$\frac{d\Omega_m}{dt} \geq 0$$

where Ω_m is the set of viable future model configurations that remain compatible with both past and anticipated data. A model that becomes too rigid in its coherence mapping may temporarily achieve high truth alignment but will fail in the long run when the object undergoes adaptive change.

Self-correction is the operational core of Synthetic Epistemology. Because both models and their objects exist within dynamic, adaptive environments, alignment between them can never be permanently secured. Even the most accurate model at a given moment is, at best, a provisional success. The epistemic system must therefore treat its own structure as subject to the same persistence criteria it applies to its objects; it must maintain internal coherence, adapt to external perturbations, prune incoherence, and preserve its adaptive option space.

Self-correction operates at two scales: reactive and proactive. Reactive correction is triggered by detected misalignment, when predictions fail or coherence mapping degrades. Proactive correction anticipates future misalignment by monitoring environmental trends, identifying potential shifts in the object's coherence structure, and preparing model revisions before failure occurs.

Epistemic stagnation occurs when a model achieves internal coherence but ceases to engage in recursive arbitration with its object's evolving coherence. Such a model may remain logically consistent yet drift increasingly out of alignment with reality, becoming a closed symbolic system disconnected from persistence-qualified structures. This is the epistemic analogue of symbolic lock-in.

Avoiding stagnation requires deliberate integration of perturbation and novelty into the epistemic process. Models must periodically be subjected to stress tests, exposures to atypical conditions, alternative data sources, or contrarian perspectives, to ensure that their coherence is not merely the product of internal symmetry but reflects actual correspondence with the adaptive reality they represent. This continuous challenge-response cycle mirrors the environmental pressures that drive persistence in physical systems.

In the larger philosophical architecture, Synthetic Epistemology serves as the link between ontology and symbolic systems. From Dynamic Materialism, it inherits the recognition that all real systems persist only through adaptive coherence maintenance. From Adaptive Realism, it adopts the definition of the real as that which survives recursive arbitration. Its role is to ensure that our representations of the real are themselves subject to equivalent persistence testing.

By enforcing the invariants of coherence weighting, pruning of incoherent signals, and preservation of option space, Synthetic Epistemology keeps knowledge systems dynamically aligned with reality rather than statically aligned with past conditions. This alignment is measured not by momentary fit but by the capacity of the model to track and adapt to the recursive coherence of its object over time.

Synthetic Epistemology also directly supports the prevention of symbolic lock-in. When knowledge systems are built with option space preservation and systematic pruning, they resist the tendency toward rigid, self-referential closure. They remain open to adaptive

correction, ensuring that symbolic systems stay connected to the persistence criteria that define reality.

Synthetic Epistemology formalizes knowledge as a process of recursive coherence tracking. Truth is the dynamic alignment between the coherence of a model and the coherence of its object, sustained through repeated cycles of arbitration. This process is governed by three invariants, coherence weighting, pruning of incoherent signals, and preservation of option space, that ensure knowledge systems remain adaptive rather than static. Through self-correction and the deliberate avoidance of epistemic stagnation, Synthetic Epistemology maintains the vitality of the knowledge–reality relationship, integrating the ontological insights of Dynamic Materialism and Adaptive Realism into a unified framework capable of diagnosing and preventing symbolic lock-in.

Symbolic Lock-In, Failure Mode of the Symbolic Layer

Symbolic lock-in is the condition in which a symbolic system, such as a network of signs, categories, and formal rules, enters a self-reinforcing loop of internal coherence that has become decoupled from adaptive reality. In this state, the symbols retain logical or procedural consistency within their own framework but no longer track the persistence-qualified structures that define reality under Dynamic Materialism and Adaptive Realism. The result is a closed symbolic economy in which meaning is generated, circulated, and validated internally, with little or no feedback from the external coherence constraints that originally grounded it.

Symbolic systems are essential for compressing, storing, and transmitting information. They allow human cognition and culture to operate at scales far beyond the immediate here-and-now. Yet the very stability that makes symbols powerful also makes them vulnerable to becoming self-stabilizing attractors. Once established, a symbol system can survive through social, institutional, or cognitive reinforcement even when its referential link to adaptive reality is broken. Symbolic lock-in is therefore a predictable outcome whenever the symbolic layer loses its recursive coherence tracking function.

A symbolic system enters lock-in when three conditions are met:

1. High internal coherence: The system's elements and relations are self-consistent and mutually reinforcing.
2. Loss of referential feedback: The system's accuracy or applicability is no longer tested against the recursive coherence of its referents.
3. Self-reinforcing reproduction: The system's continued existence depends more on its ability to reproduce itself than on its ability to represent or interact with persistence-qualified reality.

Under these conditions, the symbolic layer becomes a self-referential attractor. It continues to evolve, but its evolution is governed primarily by internal selection pressures, social prestige, institutional survival, or cognitive ease rather than by adaptive correspondence with the real.

In psychology, symbolic lock-in is visible in rigid belief systems and cognitive schemas that persist despite contradictory evidence. A person may hold a fixed identity narrative, "I am unlucky," "The world is out to get me," and interpret all experiences through this lens.

Incoming signals that support the narrative are amplified; those that contradict it are reinterpreted or dismissed. The belief system's internal coherence strengthens over time, but its alignment with reality diminishes. Cognitive biases such as confirmation bias and motivated reasoning are mechanisms that facilitate and stabilize such lock-in, allowing maladaptive narratives to persist across decades.

Therapeutic interventions often attempt to break lock-in by re-exposing the symbolic layer to disconfirming feedback under conditions that make integration possible. Without such interventions, the symbolic system continues to conserve itself, even when doing so degrades adaptive capacity.

In governance, symbolic lock-in can manifest as institutional protocols, laws, or policy frameworks that remain in force long after the conditions they were designed to address have changed. A legal code may contain outdated statutes whose enforcement now actively undermines social well-being, yet institutional inertia, bureaucratic self-preservation, and vested interests prevent revision.

A prime example is regulatory capture, in which oversight bodies become more responsive to the industries they regulate than to the public interest. The language, metrics, and procedural forms of regulation continue to operate with perfect internal consistency, but the referential connection to public safety or environmental sustainability is eroded. The symbolic framework is still "working" in the sense that it processes cases, issues rulings, and maintains formal legality, yet the system's adaptive purpose has been replaced by self-maintenance.

In science, symbolic lock-in can occur when a theoretical framework becomes so entrenched that alternative paradigms are not seriously considered, even in the face of mounting anomalies. The history of science contains many examples of this dynamic, from the geocentric model's persistence for centuries to the resistance faced by plate tectonics in its early decades. In each case, the dominant symbolic framework was internally coherent, deeply integrated with educational and institutional structures, and reinforced by social and professional incentives.

Lock-in is not limited to grand theories; it can occur in smaller domains through overreliance on specific statistical methods, measurement techniques, or model assumptions. When peer review, funding decisions, and publication standards all reference the same symbolic framework, a feedback loop forms that rewards internal coherence over adaptive correspondence with the physical world. The result can be decades of research that refines a symbolic system without significantly improving its ability to track reality.

From the perspective of this philosophical framework, symbolic lock-in is not an accidental corruption but a predictable failure mode of the symbolic layer. Symbols are optimized for stability and transmissibility; both of these traits increase the risk of self-reinforcing closure. Once a symbolic system is sufficiently stable, the selection pressures acting on it may shift from alignment with reality to alignment with its own reproduction. This transition is often invisible to participants because internal coherence remains high, creating the illusion of continued accuracy.

Dynamic Materialism shows that persistence in the physical world requires active coherence maintenance in the face of entropy. Adaptive Realism applies the same criterion

to ontology, identifying the real as that which survives recursive arbitration. Synthetic Epistemology extends the principle to knowledge systems, demanding ongoing alignment between model coherence and the coherence of its object. Symbolic lock-in emerges when the symbolic layer fails to maintain this alignment, instead optimizing for coherence in isolation from its referents.

Synthetic Epistemology is explicitly designed to prevent symbolic lock-in by enforcing three invariants:

1. Coherence weighting: Prioritizing features that contribute most directly to the persistence of the referent ensures that symbolic systems are anchored to adaptive reality.
2. Pruning incoherent signals: Removing elements that degrade truth alignment prevents the symbolic system from accumulating noise that obscures reality tracking.
3. Preservation of option space: Ensuring that symbolic frameworks remain revisable under changing conditions prevents rigid closure and maintains adaptive flexibility.

By embedding these invariants in the epistemic process, Synthetic Epistemology ensures that symbolic systems remain under continuous referential pressure. Internal coherence remains necessary but is never sufficient; it must be coupled to external arbitration against persistence-qualified structures.

Preventing symbolic lock-in requires institutional and cognitive architectures that can integrate destabilizing feedback without collapsing. This involves redundancy in feedback channels; multiple, independent pathways for referential testing reduce the risk of total

decoupling. Periodic disruption protocols, with deliberate introduction of alternative perspectives and models can break self-reinforcing cycles, and transparent performance metrics, with criteria for evaluating symbolic systems must reference adaptive outcomes rather than internal measures of coherence alone.

At the individual level, cultivating epistemic humility and active error-seeking behavior reduces the likelihood of personal symbolic lock-in. At the societal level, designing institutions that reward reality-aligned adaptability over symbolic self-preservation is essential.

Symbolic lock-in is the failure mode in which the symbolic layer detaches from the adaptive reality it was built to represent, becoming a self-referential attractor. It is characterized by high internal coherence, loss of referential feedback, and self-reinforcing reproduction. This condition is observable in psychology, governance, and science, and it arises predictably from the inherent stability and transmissibility of symbolic systems.

By grounding ontology in persistence (Adaptive Realism) and defining knowledge as recursive coherence tracking (Synthetic Epistemology), this framework provides both a diagnostic and a preventive strategy. Synthetic Epistemology's invariants keep symbolic systems open to correction and anchored to reality, countering the drift toward self-referential closure. Recognizing symbolic lock-in as a predictable and measurable failure mode allows us to design epistemic and institutional safeguards that maintain the alignment of the symbolic layer with the adaptive, coherence-driven processes that define the real.

Integration, The Recursive Architecture

This framework rests on a recursive causal loop in which each layer builds upon, constrains, and in turn shapes the others. This architecture ensures that ontology, epistemology, and symbolic systems remain grounded in the adaptive, coherence-driven dynamics that define reality, while also providing a diagnostic path for identifying and correcting systemic failure.

At the base of the loop is Dynamic Materialism, which defines matter not as static substance but as coherence-constrained adaptive flux. Persistence is not an ontological given; it is an active process in which structures maintain themselves against entropy through adaptive coherence maintenance. This level establishes the universal persistence criteria: *a system exists meaningfully only if it sustains or increases its coherence faster than it is eroded by entropy*.

Everything higher in the architecture inherits this constraint. Any ontology, epistemology, or symbolic system that claims to describe the real must ultimately be compatible with the persistence logic of Dynamic Materialism. This grounding prevents philosophical abstraction from drifting into unsupported metaphysical speculation.

Adaptive Realism applies the persistence condition of Dynamic Materialism to ontology. The real is defined as that which persists across recursive coherence arbitration: *the repeated testing of a system's stability in the face of perturbations*. This positions reality as neither static nor purely constructed. It exists independently of perception, yet it is filtered by the persistence thresholds that determine survival in a coherence-constrained universe.

Because Dynamic Materialism identifies persistence as active process, Adaptive Realism necessarily treats reality as an evolving set of adaptive survivors rather than a fixed inventory.

This in turn constrains epistemology: *knowledge cannot be about immutable absolutes but must be about tracking systems whose persistence is contingent and continuously negotiated*.

Synthetic Epistemology governs the evolution of knowledge in this persistence-defined reality. Truth is maximal alignment between the internal coherence of a model and the recursive coherence of its object. Knowledge systems must remain adaptive, using coherence weighting to prioritize persistence-relevant features, pruning incoherent signals to avoid informational decay, and preserving option space to ensure continued revisability.

Here the recursion deepens. Adaptive Realism determines what counts as "real" by persistence testing. Synthetic Epistemology ensures that our symbolic and conceptual models remain in adaptive alignment with that reality. Dynamic Materialism guarantees that both reality and our models are subject to the same underlying thermodynamic and coherence constraints.

Synthetic Epistemology's invariants serve not only to advance knowledge but also to prevent symbolic closure, ensuring that our symbolic systems remain tethered to the adaptive logic of the real.

Symbolic lock-in is the failure mode that arises when the symbolic layer, our language, models, and conceptual frameworks, becomes self-referential, maintaining high internal coherence while losing referential contact with persistence-qualified structures. This pathology is predictable because symbols are optimized for stability and transmissibility; without ongoing referential arbitration, they tend to evolve under internal selection pressures rather than external reality constraints.

Once lock-in occurs, the symbolic layer resists correction. It amplifies confirming signals from within its own framework, prunes external perturbations as noise, and shifts its persistence logic from reality-tracking to self-reproduction. Left unchecked, symbolic lock-in leads to epistemic stagnation, institutional ossification, and the propagation of ontologically empty frameworks.

This recursive architecture forms a closed causal loop:

1. Dynamic Materialism → Adaptive Realism: Physical persistence conditions define what counts as real.
2. Adaptive Realism → Synthetic Epistemology: Reality as persistence-qualified sets the target for knowledge alignment.
3. Synthetic Epistemology → Symbolic Layer: Knowledge systems structure symbolic representation to track persistence.
4. Symbolic Layer → Ontology and Reality: Accurate symbols feed back into epistemology, refining ontology and even shaping physical persistence outcomes through intervention.
5. Symbolic Lock-In → Disruption of Loop: Decoupling of symbols from adaptive reality disrupts the feedback cycle, leading to drift and maladaptation.

Safeguards are embedded in Synthetic Epistemology to maintain loop integrity. Redundant referential testing ensures that symbols are compared against multiple, independent measures of reality; deliberate perturbation introduces structured novelty, preventing overfitting to past conditions; and option space preservation keeps the symbolic layer flexible enough to realign with shifting persistence conditions.

These safeguards reinsert reality-based constraints into the symbolic layer, reestablishing alignment when drift occurs.

The master definition of this integrated framework is that *reality, knowledge, and meaning are nested coherence-maintenance systems constrained by adaptive persistence*. Dynamic Materialism defines the substrate as coherence-constrained adaptive flux. Adaptive Realism defines reality as that which survives recursive persistence testing within that substrate. Synthetic Epistemology defines truth as maximal model–world coherence alignment over recursive scales. Symbolic Lock-In defines the primary failure mode when the symbolic layer ceases to be governed by these constraints.

The recursion is exact. Each layer inherits the recursive coherence logic of the one beneath it and imposes adaptive constraints on the one above. The architecture is thus self-similar across ontological, epistemological, and symbolic domains; a fractal of persistence logic.

Because each layer's success condition is defined in terms of coherence maintenance, failure at one layer propagates upward, but correction can be initiated from any layer. Epistemic reform can realign symbolic systems; symbolic reform can restore ontology tracking; ontological revision can update epistemology; and physical intervention can restore the persistence conditions of the substrate. This multi-entry correction capacity is a direct consequence of the recursive architecture.

This recursive architecture integrates the four pillars into a single, closed-loop system in which each layer's logic flows directly into the next. Dynamic Materialism sets the universal persistence criteria, Adaptive Realism applies those criteria to ontology, Synthetic Epistemology structures knowledge to track persistence-qualified reality, and Symbolic

Lock-In identifies and diagnoses the failure mode when the symbolic layer detaches. Feedback loops and safeguards embedded in this architecture ensure that the system remains self-correcting, adaptive, and resistant to drift.

By repeatedly reaffirming the master definition at every scale, the architecture maintains internal coherence while preserving option space, ensuring that reality, knowledge, and meaning remain dynamically aligned within the same persistence logic that governs the physical substrate itself.

Implications and Applications

The integrated framework of Dynamic Materialism, Adaptive Realism, Synthetic Epistemology, and the diagnosis of Symbolic Lock-In yields direct, actionable implications across multiple domains. While the architecture is philosophical in origin, its utility lies in its capacity to diagnose, predict, and correct systemic failures in any context where information, meaning, and action are mediated through symbolic systems. This section examines four key areas, philosophy of science, AI alignment, cultural critique, and governance, each of which benefits from the framework's capacity to sustain recursive coherence tracking and to prevent closure into self-referential stagnation.

Philosophy of Science: Preventing Theory Ossification

Science operates as a recursive process of model refinement, but it is vulnerable to the same closure dynamics that produce symbolic lock-in in other domains. A theory begins as a representation of persistence-qualified structures, derived from empirical observation and constrained by logical coherence. Over time, however, the institutional and educational

embedding of a theory can produce high internal coherence within its own symbolic framework while reducing its exposure to disruptive feedback. This results in theory ossification. An epistemic state in which anomalies are marginalized or reinterpreted rather than serving as triggers for paradigm revision.

This framework counters this tendency by embedding the invariants of Synthetic Epistemology into scientific practice. Coherence weighting forces prioritization of evidence that bears directly on a theory's capacity to track the real, discouraging the overemphasis on data that fits pre-existing symbolic structures. Pruning incoherent signals applies not only to removing irrelevant data but also to discarding symbolic elaborations that no longer enhance predictive or explanatory power. Preservation of option space prevents methodological and theoretical rigidity, ensuring that alternative hypotheses and novel experimental designs remain viable.

Applied in this way, the framework shifts philosophy of science from passive meta-analysis to an active safeguard system against epistemic drift. Instead of treating paradigm shifts as rare upheavals, it normalizes micro-revisions, maintaining model–world alignment in a continuous fashion.

AI Alignment: Maintaining Coherence Tracking in Machine Reasoning

Artificial intelligence systems, particularly large-scale language and reasoning models, operate within symbolic spaces that can achieve extremely high internal coherence while diverging from reality. The risk is not merely factual error but systematic symbolic lock-in, where the model optimizes for outputs consistent with its internal training distribution rather than with persistence-qualified reality. In AI safety discourse, this manifests as reward

hacking, specification gaming, and overfitting; symptoms of a symbolic layer detached from its grounding substrate.

This framework provides an alignment criterion grounded in recursive coherence tracking. Dynamic Materialism ensures that AI representations must ultimately be tethered to persistence-constrained reality, whether through physical sensor data, economic feedback loops, or validated empirical inputs. Adaptive Realism requires that AI representations pass recursive arbitration tests over time, proving their ability to maintain alignment under changing conditions. Synthetic Epistemology supplies operational safeguards; weighting signals by relevance to persistence, pruning features that degrade tracking accuracy, and maintaining an open option space for model architecture and data ingestion.

In this application, AI alignment is reframed as maintaining model–world coherence under dynamic conditions, not simply preventing harmful outputs or optimizing fixed reward functions. This prevents drift into self-referential symbolic states that are insulated from empirical correction.

Moreover, the framework highlights that AI systems, like human epistemic systems, must be regularly re-exposed to reality-based perturbations. Synthetic Epistemology's emphasis on deliberate novelty introduction becomes critical. Periodic injection of unfamiliar contexts or adversarial scenarios forces models to demonstrate adaptive capacity rather than merely internal consistency.

Cultural Critique: Diagnosing Ideological Rigidity

Cultural systems, from political ideologies to religious traditions, are structured symbolic frameworks designed to compress and transmit collective meaning. Their stability enables

identity continuity and social coordination, but it also predisposes them to symbolic lock-in. Once an ideology achieves internal closure, its capacity to integrate feedback from external reality diminishes, and it may persist even when its prescriptions erode adaptive capacity for the group that upholds it.

This framework offers a diagnostic method for ideological rigidity:

1. Reality Tracking Test: Does the ideology maintain alignment with persistence-qualified structures, or does it primarily reference its own symbols?
2. Feedback Responsiveness: When exposed to contradictory evidence or changing conditions, does the ideology update adaptively, or does it reinterpret reality to fit its pre-established symbolic order?
3. Option Space Measure: Does the ideology preserve a viable range of adaptive policy or belief modifications, or does it collapse into binary acceptance/rejection positions?

These diagnostic criteria allow for nonpartisan evaluation of ideological health. An ideology may retain its identity while still adapting to changing environmental, technological, or demographic conditions, provided it remains open to coherence-relevant feedback. When it fails these tests, symbolic lock-in is present, and the cultural system risks becoming maladaptive even as it continues to exhibit strong internal solidarity.

This framework also clarifies that ideological rigidity is not synonymous with moral commitment. A belief system can retain core commitments while allowing for interpretive and procedural flexibility, maintaining coherence with the evolving reality it seeks to

navigate. In this sense, symbolic resilience, the capacity of a symbolic system to preserve its identity while adapting, is the cultural analogue of persistence in Dynamic Materialism.

Governance: Designing Adaptive Policy Frameworks

Governance operates at the intersection of symbolic representation and material reality. Laws, regulations, and policy instruments are symbolic constructs that aim to influence persistence-qualified systems, such as economies, environments, and social orders. The recurrent failure mode is the ossification of governance structures. Procedures and policies become optimized for their own reproduction within bureaucratic frameworks rather than for ongoing alignment with the adaptive needs of the governed system.

By applying this framework, governance can be redesigned to operate as an adaptive coherence maintenance system. Dynamic Materialism establishes that governance operates in a finite resource and entropy-limited physical substrate, imposing hard limits on sustainable policy trajectories. Adaptive Realism frames policy success in terms of persistence; a governance system's legitimacy derives from its ability to sustain the adaptive capacity of the population and environment over time. Synthetic Epistemology embeds operational safeguards into policy development. Coherence weighting prioritizes data and indicators most relevant to system-level persistence (ecological stability, economic resilience); pruning removes outdated or contradictory policy measures that erode adaptive performance; and option space preservation ensures that governance remains flexible, allowing for rapid reconfiguration under emergent conditions.

Practical implementation includes iterative policy cycles that test small-scale interventions before scaling, use multi-channel feedback from diverse stakeholders, and maintain sunset

clauses or periodic review mandates to prevent symbolic closure. These measures convert governance from a rule-preserving to a reality-preserving enterprise.

Cross-Domain Convergence

While these domains differ in scale and implementation, the same structural insight applies: *any system that depends on symbolic mediation for decision-making or coordination is vulnerable to lock-in unless it remains under continuous referential pressure from persistence-qualified reality*. This recursive architecture ensures that every level (material substrate, ontological definition, epistemic process, symbolic representation) is bound by the same coherence maintenance logic.

In science, this prevents the entrenchment of theories that no longer track empirical reality. In AI, it keeps machine reasoning tethered to adaptive truth rather than drifting into statistical self-consistency. In culture, it sustains the relevance of collective meaning systems by maintaining openness to environmental and historical shifts. In governance, it aligns policy frameworks with the evolving persistence conditions of the society and environment they regulate.

The implications of this framework extend beyond diagnosis into prescriptive design. By embedding the invariants of Synthetic Epistemology into the operational logic of scientific institutions, AI systems, cultural discourse, and governance, we can construct systems that self-correct before failure, rather than collapse and rebuild after failure.

The architecture's unifying principle, that reality, knowledge, and meaning are nested coherence-maintenance systems, allows for a single criterion of health across domains: *the degree to which a system sustains alignment with persistence-qualified reality over*

recursive cycles of arbitration. Systems that preserve this alignment remain adaptively viable; those that lose it drift toward symbolic lock-in and eventual maladaptation.

This is not a call for a single ideology, method, or institutional form, but for a universal structural discipline in which the adaptive grounding of all symbolic systems is continuously tested and reinforced. Whether in science, AI, culture, or governance, the measure of long-term success is the same; the sustained capacity to navigate a coherence-constrained universe without succumbing to the closure of one's own symbolic constructions.

Conclusion

At the foundation of this framework is a single, coherence-first principle: *persistence requires adaptability*. Across all domains, physical, ontological, epistemic, and symbolic, survival depends on the capacity to maintain and evolve coherence in the face of entropy, novelty, and perturbation. This principle threads the entire architecture.

Persistence through adaptability is established by Dynamic Materialism, which defines the physical substrate as coherence-constrained adaptive flux rather than inert substance. Matter and systems alike endure only through active maintenance against decay, making adaptability the primary condition of continued existence.

Ontological openness is enforced by Adaptive Realism, which defines the real as that which survives recursive coherence arbitration. Reality is neither fixed nor purely constructed; it is a set of structures and processes that prove their persistence across changing conditions. This openness guards against the premature closure of ontology, keeping the category of "the real" responsive to empirical and structural change.

Epistemic synthesis is operationalized through Synthetic Epistemology, which defines truth as maximal alignment between a model's internal coherence and the recursive coherence of its object. This synthesis unites correspondence and coherence theories of truth under a persistence criterion, embedding self-correction as a necessary condition for ongoing alignment.

Symbolic self-audit arises from diagnosing Symbolic Lock-In as the predictable failure mode of the symbolic layer when it becomes self-referential and decoupled from adaptive reality. By treating this detachment as structurally inevitable unless actively prevented, the framework makes symbolic self-audit an integral component of any healthy knowledge system.

These four pillars are not discrete doctrines but nested levels in a recursive system. Each layer inherits its persistence logic from the one beneath it while constraining the one above. Dynamic Materialism supplies the substrate logic; Adaptive Realism applies it to ontology; Synthetic Epistemology governs knowledge construction within that ontology; and Symbolic Lock-In identifies the pathology that occurs when the symbolic layer loses its grounding. The system forms a closed causal loop, in which feedback safeguards maintain alignment across layers.

A distinctive feature of this philosophy is that it applies its own safeguards to itself. This framework is not exempt from the risk of symbolic lock-in; its definitions, invariants, and diagnostic tools are symbolic constructions that can, in principle, drift from adaptive reality. To prevent this, the framework is deliberately structured as an instance of its own Synthetic Epistemology.

This recursive safeguard functions in three ways:

1. Coherence Weighting on Itself: This framework must prioritize elements that demonstrably contribute to its capacity to track reality. Peripheral or ornamental elements that do not enhance this capacity are subject to pruning.
2. Pruning Internal Incoherence: Should contradictions emerge between its conceptual layers, these must be resolved through revision, even if such revisions alter longstanding definitions.
3. Preservation of Option Space: The framework's architecture must remain flexible enough to incorporate new ontological insights, epistemic tools, or empirical findings without requiring wholesale abandonment of its coherence structure.

This self-application prevents this philosophy from becoming an ideology. It is not a closed system claiming final authority, but an open, adaptive process designed to test and revise itself continuously.

Across its layers, the measure of systemic health is the same: *the capacity to sustain alignment with persistence-qualified reality through repeated cycles of arbitration*. Systems that pass this test remain viable; those that fail drift toward symbolic closure and eventual maladaptation. This coherence criterion transcends the particularities of domain or scale, making it applicable to scientific theory, AI reasoning, cultural narratives, and governance systems alike.

Crucially, the framework does not merely diagnose failures after the fact; it embeds preventive safeguards at each stage. Ontology remains open-ended under Adaptive Realism. Epistemology is continuously self-correcting under Synthetic Epistemology.

Symbolic systems are monitored for drift toward closure and actively realigned through deliberate exposure to reality-based perturbations.

This framework positions philosophy not as a static repository of truths but as an adaptive instrument. A set of tools for maintaining recursive coherence between our symbolic constructions and the adaptive reality they aim to represent. It does not seek immunity from change; its authority rests on its capacity to remain responsive to change without collapsing its structural identity.

The recursive safeguard is therefore both a theoretical commitment and a practical discipline. It ensures that this philosophy's continued relevance is measured not by fidelity to its original form, but by its ability to maintain model–world coherence under shifting conditions.

In a coherence-constrained universe, persistence is not granted; it is earned through continuous adaptation. By aligning ontology, epistemology, and symbolic systems under the same persistence logic, this framework provides a unified method for diagnosing and preventing drift into self-referential closure. The recursive safeguard ensures that the framework itself remains open to revision, preserving its ability to track the real while resisting the gravitational pull of symbolic lock-in.

Philosophy, under this model, becomes a living process, coherence maintained across scales, tested against reality, and capable of self-audit. It survives, as all viable systems do, by adapting in order to persist.

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